

REMARKS

Claims 1-4 and 6-8 are pending in this application. By this Amendment, claim 1 is amended. Support for amended claim 1 can be found at least at page 7, lines 7-17 of the specification as originally filed. No new matter is added. In view of the foregoing amendments and the following remarks, reconsideration and allowance are respectfully requested.

Entry of the amendments is proper under 37 CFR §1.116 since the amendments: (a) place the application in condition for allowance for the reasons discussed below; (b) do not raise any new issue requiring further search and/or consideration as the amendments amplify issues previously discussed throughout prosecution; (c) satisfy a requirement of form asserted in the previous Office Action; (d) do not present any additional claims without canceling a corresponding number of finally rejected claims; and (e) place the application in better form for appeal, should an appeal be necessary. The amendments are necessary and were not earlier presented because they are made in response to arguments raised in the final rejection. Entry of the amendments is thus respectfully requested.

I. Rejection Under 35 U.S.C. § 112

Claims 1-4 and 6-8 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite. By this Amendment, claim 1 is amended to clarify the claim language. Reconsideration and withdrawal of the rejection are respectfully requested.

II. Rejections Under 35 U.S.C. §102 and §103

A. Nishimura

Claims 1-4 and 6-8 are rejected under 35 U.S.C. §102(e), or alternatively under 35 U.S.C. §103(a), over Nishimura. Applicant respectfully traverses the rejection.

Independent claim 1 is directed to a process of producing a circularly-polarized-light-separating element, comprising: a first step of applying, to a substrate having alignment

power, a cholesteric liquid crystal solution prepared by dissolving a radiation-polymerizable cholesteric liquid crystalline material in a solvent, thereby forming a film; a second step of removing the solvent from the film formed in the first step by heating the film beyond its phase transition temperature, thereby obtaining an uncured cholesteric liquid crystal film; and a third step of supercooling the uncured cholesteric liquid crystal film formed in the second step, and then applying, for curing, radiation to the uncured cholesteric liquid crystal film formed, while holding a phase of this film to a supercooled cholesteric one, thereby obtaining a cured cholesteric liquid crystal film. Such a process is not taught or suggested by Nishimura.

In contrast to the claimed invention, Nishimura fails to disclose, teach or suggest the combination of steps of heating the film beyond its phase transition temperature, thereby obtaining an uncured cholesteric liquid crystal film, followed by supercooling the uncured cholesteric liquid crystal film formed in the second step and then applying, for curing, radiation to the uncured cholesteric liquid crystal film, as claimed.

First, Nishimura teaches that, "cooling is preferably conducted, if required." See Nishimura at col. 13, lines 19-20. When heat treatments for the alignment formation and the crosslinking reaction are conducted at the same time, cooling is not required because the cholesteric alignment can be fixed by the crosslinking reaction. See Nishimura at col. 13, lines 19-25. On the other hand, claim 1 of the instant application requires a "supercooling" third step followed by radiation for curing.

The Office Action asserts that Nishimura achieves the supercooling effect, because Nishimura allows the film to cool to room temperature. According to the Applicant's disclosure, "'Supercooled' means that even when a melted or fluid compound is cooled to a temperature below its phase transition temperature, it does not undergo phase transition and retains its original phase, and herein indicates that the cholesteric liquid crystal film 14 is

cooled to a temperature lower than the intrinsic phase transition temperature (lower limit) of its cholesteric phase." See Specification, p. 8, lines 3-10. Moreover, supercooling does not have to be room temperature. Nishimura does not specifically teach a supercooling to room temperature, but allows the film to reach room temperature. Therefore, Nishimura does not teach or suggest a third step of "supercooling."

Nishimura not only fails to teach or suggest the particular limitations of claim 1, but in fact teaches directly the opposite. Nishimura teaches "the light irradiation may properly be conducted after reheating the coat layer so as to impart the fluidity thereto because of the low cross-linking rate of the liquid crystal layer." See Nishimura at col. 14, lines 11-16 (emphasis added). That is, while the claimed invention performs the radiation curing to the uncured cholesteric liquid crystal film in the supercooled state, Nishimura teaches light irradiation after reheating the coat layer so as to impart the fluidity to the coat layer. Nishimura does not teach or suggest that light irradiation could or should be conducted when the uncured cholesteric liquid crystal film is in the supercooled state.

The Office Action asserts that the step shown in Applicant's disclosure is substantially identical to the method described in Nishimura. Applicant's disclosure states, "In the step shown in FIG. 1(c), the cholesteric liquid crystal film 14 may be heated or shaken in order to more fully align liquid crystalline molecules in it. Further, the step shown in FIG. 1(c) is not necessarily essential and can be omitted if liquid crystalline molecules in the cholesteric liquid crystal film 14 are fully aligned in the step shown in FIG. 1(b)." See Specification, p. 6, line 35 - p. 7, line 6). The Office Action compares this embodiment to Nishimura's disclosure, which states, "However the dried coat layer is required to undergo a heat treatment after the drying process in order to render the alignment of the liquid crystal more complete and to effect the crosslinking reaction." See Nishimura at col. 12, lines 29-33.

Applicant respectfully disagrees with the Office Action, because this description is only one embodiment of Applicant's invention and the amended claim 1 no longer includes this embodiment. Amended claim 1 requires the third step of supercooling the uncured cholesteric liquid crystal formed in the second step followed by radiation. The claim does not provide for additional heating or shaking and Nishimura does not teach a supercooling step followed by radiation.

Because Nishimura fails to teach or suggest each and every feature of claim 1, Nishimura does not anticipate and would not have rendered obvious the subject matter of claim 1. Claims 2-4 and 6-8 depend from claim 1 and, thus, also are not anticipated and would not have been rendered obvious by Nishimura. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

B. Kawamoto, Nishimura, and Gibbons

Claims 1-4 and 6-8 are rejected under 35 U.S.C. §103(a) over Kawamoto, in view of Nishimura, and further in view of Gibbons. Applicant respectfully traverses the rejection.

Claim 1 and Nishimura are discussed in detail above. The Office Action asserts that Kawamoto discloses all of the limitations of the claimed invention, except (1) that the liquid crystal polymer is a photopolymerizable polymer which is cured at room temperature, and (2) forming a second cholesteric liquid crystal polymer layer on the cured cholesteric liquid crystal polymer layer. The Office Action then cites Nishimura as above, for teaching that it is known to cure a photopolymerizable polymer at room temperature, and cites Gibbons for teaching forming a second cholesteric liquid crystal polymer layer on the cured cholesteric liquid crystal polymer layer.

However, regardless of the actual teachings of Kawamoto, Nishimura and Gibbons, none of the references teach or suggest the features of independent claim 1 of heating the film beyond its phase transition temperature, thereby obtaining an uncured cholesteric liquid

crystal film, followed by supercooling the uncured cholesteric liquid crystal film formed in the second step, and then applying, for curing, radiation to the uncured cholesteric liquid crystal film. The Office Action admits that Kawamoto does not teach these limitations. Further, as described above, Nishimura not only fails to teach or suggest these limitations, but teaches directly the opposite that "the light irradiation may properly be conducted after reheating the coat layer so as to impart the fluidity thereto because of the low cross-linking rate of the liquid crystal layer" (emphasis added). Rather than teaching the claim limitations, as asserted in the Office Action, Nishimura teaches directly the opposite and thus teaches away from the claimed invention. Neither Nishimura, nor Kawamoto or Gibbons, teach or suggest that light irradiation could or should be conducted after the uncured cholesteric liquid crystal film is in the supercooled state.

The Office Action contends that (1) claim 1 does not recite a negative limitation against a second heat treatment before cooling to a room temperature and (2) Kawamoto et al. teach the second step of volatilizing the solvent. First, as amended, claim 1 requires, "a third step of supercooling the uncured liquid crystal film formed in the second step and then applying, for curing, radiation. Therefore, the amended claim shows that the radiation is applied directly after the supercooling. None of the references teach or suggest step.

Second, Kawamoto and Nishimura, alone or in combination, fail to teach the radiation directly after supercooling. Nishimura teaches directly the opposite that "the light irradiation may properly be conducted after reheating the coat layer so as to impart the fluidity thereto because of the low cross-linking rate of the liquid crystal layer" (emphasis added). Rather than teaching the claim limitations, as asserted in the Office Action, Nishimura teaches directly the opposite and thus teaches away from the claimed invention. Neither Nishimura, nor Kawamoto or Gibbons, teach or suggest that light irradiation could or should be conducted when the uncured cholesteric liquid crystal film is in the supercooled state.

As Kawamoto, Nishimura, and Gibbons, alone or in combination, fails to teach or suggest each and every feature of claim 1, the cited references would not have rendered obvious the subject matter of claim 1. Claims 2-4 and 6-8 depend from claim 1 and, thus, also would not have been rendered obvious by Nishimura. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

C. Nishimura, Kawamoto, Kameyama, and Gibbons

Claims 6-8 are rejected under 35 U.S.C. §103(a) over Nishimura, in view of Kawamoto or Kameyama, and further in view of Gibbons. Applicant respectfully traverses the rejection.

With respect to Claim 1, Nishimura, Kawamoto, Kameyama, and Gibbons are discussed in detail above. For all of the reasons set forth above, none of the references teach or suggest the features of independent claim 1 of heating the film beyond its phase transition temperature, thereby obtaining an uncured cholesteric liquid crystal film, followed by supercooling the uncured cholesteric liquid crystal film formed in the second step and applying, for curing, radiation to the uncured cholesteric liquid crystal film. As Nishimura, Kawamoto, Kameyama, and Gibbons, alone or in combination, fails to teach or suggest each and every feature of claim 1, the cited references would not have rendered obvious the subject matter of claim 1.

Claims 6-8 depend from claim 1 and, thus, also would not have been rendered obvious by Nishimura. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

III. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the application are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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Date: July 9, 2007

Attachment:

Petition for Extension of Time

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